

13. Maximum Permissible Exposure (MPE)

13.1. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with § 2.1091 radiofrequency radiation exposure evaluation: mobile devices of the FCC CFR 47 Rules, CFR 1.1310 (b) Radio frequency Radiation Exposure Requirement.

13.2. Special Accessories

Not available for this EUT intended for grant.

13.3. Equipment Modifications

Not available for this EUT intended for grant.

13.4. Limitation

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

13.5. Maximum Permissible Exposure (MPE) Evaluation

The evaluation and calculation as deduces below presents only worst-case that produces highest value of the result:

Operation Configuration of the Worst-Case picked up to evaluate:

GPRS 850 / 1900 (The Worst Case)

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Operation in GPRS850 band (824.2 – 848.8 MHz)-Antenna 4

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 850	824.2	128	V	21	5.48	-3.38	23.1	38.45
			H	26.14	5.48	-3.38	28.24	38.45
	836.6	190	V	21.36	5.46	-3.28	23.54	38.45
			H	27.9	5.46	-3.28	30.08	38.45
	848.8	251	V	19.85	5.45	-3.09	22.21	38.45
			H	27.47	5.45	-3.09	29.83	38.45

$$\text{Power Density} = \text{EIRP} \cdot \text{Duty Cycle} / (4\pi R^2)$$

Duty Cycle is 0.5 for GPRS 850 band operation and R is 20cm.

ERP	30.08	(dBm)
ERP	1018.591	(mW)
Duty cycle:	50	(%)
Maximum Pav :	509.295694	(mW)
Prediction distance:	20	(cm)
Prediction frequency:	836.6	(MHz)
MPE limit for uncontrolled exposure at prediction	0.5577	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.10137	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.10137 mW/cm².

This is below the uncontrolled exposure limit of 0.5577 mW/cm² at 836.6MHz.

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Operation in GPRS1900 band (1850.2 – 1909.8 MHz)-Antenna 2

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
GPRS 1900	1850.2	512	V	27.45	5.35	-5.35	27.45	33.01
			H	23.51	5.35	-5.35	23.51	33.01
	1880.0	661	V	29.14	5.28	-5.41	29.01	33.01
			H	23.31	5.28	-5.41	23.18	33.01
	1909.8	810	V	28.95	5.21	-5.39	28.77	33.01
			H	20.91	5.21	-5.39	20.73	33.01

Power Density = EIRP*Duty Cycle/(4πR²)

Duty Cycle is 0.5 for GPRS 1900 band operation and R is 20cm.

EIRP	29.01	(dBm)
EIRP	796.159	(mW)
Duty cycle:	50	(%)
Maximum Pav :	398.079675	(mW)
Prediction distance:	20	(cm)
Prediction frequency:	1880	(MHz)
MPE limit for uncontrolled exposure at prediction	1.0000	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.07924	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.07924 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 1880MHz.

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